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Author

DESCRIPTION OF AN APPARATUS

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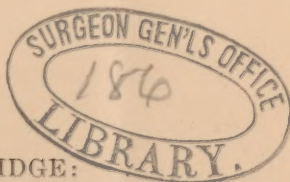
FOR THE TREATMENT OF

CONTRACTION AND FALSE ANCHY-  
LOSIS OF THE HIP-JOINT.

BY

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[Reprinted from the Records of the Boston Society for Medical  
Improvement, published in the Boston Medical and Sur-  
gical Journal, June 2, 1881.]



CAMBRIDGE:

Printed at the Riverside Press.

1881.



## DESCRIPTION OF AN APPARATUS FOR THE TREATMENT OF CONTRACTION AND FALSE ANCHYLOSIS OF THE HIP-JOINT.

BY BUCKMINSTER BROWN, M. D.

AN efficient apparatus for the treatment of contraction and false ankylosis of the hip-joint has long been a desideratum in orthopedic surgery.

In former times these sequelæ of morbus coxarius were more frequently met with than now, when the acute stages of the disease are more scientifically treated. Still, cases in which the femur is fixed at angles, varying from an acute or right angle to one where the foot is but slightly raised from the ground, are not of uncommon occurrence.

For twenty-five or more years it has been my practice to operate upon contracted muscles, tendons, or cicatricial tissues connected with the knee or hip joints : first, by subcutaneous section in the hip of the adductor longus, tensor vaginæ femoris, rectus, or sartorius, and in the knee of the biceps flexor cruris, semi-tendinosus and semi-membranosus, or such of these tissues as required division ; followed by forcible rupture of the more deeply-seated adventitious impediments to free movements, — this *brisement forcé* being in all cases carefully gauged and measured as to the degree of power employed by the amount, estimated under ether, of resistance to be overcome.

After the joint has been thus loosened, and partially straightened, the treatment in the knee is facilitated by the firm bearings to be obtained on the femur above and on the bones of the leg below. In the hip it is otherwise. The pelvis does not afford a fixed basis from which to act on the femur.

The best instruments in use by European and American surgeons but partially fulfill the required indications.

The attempt to extend the femur with any of these instruments causes the universally-recognized tilting of the pelvis, producing lordosis to a greater or less extent, thus more or less neutralizing the action of the apparatus.

The application commonly used, namely, a steel pelvic belt, with a long spring extending behind the trochanter and femur to a short distance above the knee, and strapped to the femur near its extremity, is inefficient and unreliable. It becomes easily shifted from its proper position, and when in position is rendered almost powerless by causing the incurvation of the lumbar vertebræ.

This instrument I modified by adding a broad back-board of steel, attached by a broad basis to the pelvic belt, and extending to the middle of the scapulæ. To this back-board, embracing its entire length from scapulæ to pelvis, was attached a wide abdominal belt. By this addition an endeavor was made to antagonize the action of the spring on the femur.

The desired result was not fully attained by this contrivance.

The inefficacy of the weight and pulley in cases here referred to needs no demonstration to any one who has tried the experiment.

It is requisite, in the first place, to render the pelvis a fixed centre, firm and immovable, — so firm that the leverage on the femur shall not raise the posterior brim and produce incurvation of the spine by the action of the unsevered contracted muscles and ligaments connected with the pelvic bones, and by the antagonism of the muscles arising immediately from the lumbar vertebræ and ilium.

Secondly, to secure an instrument by which, using the femur as a lever, we could extend or flex, abduct or adduct, from the joint.

It was unquestionable that the power employed must *not* be *elastic*, like that derived from a steel spring, or from a rubber band. Either of these, if sufficiently powerful to be truly efficient, in cases of the nature under consideration, cause such an amount of suffering as to become unbearable. The continued pull, from which there is no relief, exhausts the nervous system, wears out the patient, and cannot be long endured.

It has been truly said by a writer on this subject, that "There are but few maladies that cause so intense agony and prostrate the constitution in so short a time as the persistent extension of contracted muscles."

The power must be that of a screw, which can be increased so slowly as to produce the minimum of pain, and that minimum ceases when the parts have accommodated themselves to their new position, and there is an interval of rest before renewed extension is required.

These movements, to be effectual, must be carefully graduated and guarded to avoid pain, yet steady and *sure* in their action. To overcome these obstacles and to meet these requirements constituted the problem to be solved.

Professor Bauer, in his Orthopedic Surgery, when treating of fixation of the hip, describes and pictures a concave block of wood, which is accurately turned and adapted to the posterior pelvis and nates from a plaster mould. This block, with the required straps, serves as a counter-extension to the weight and pulley, by which he makes direct extension.

The mattress arranged for the patient is divided into two unequal parts, and the block is placed between them: the shorter portion for the head and shoulders, and the longer for the lower limbs.

The apparatus now presented to the society consists of such a concave block, into which the pelvis sinks. The box is so shaped as to raise the lower part of the sacrum. The nates fit into cavities moulded for them, and the thighs lie in two troughs separated by a prom-



inence rising up towards the pubis. A strong, wide, heavily-padded leather strap is fastened to the box on each side, and buckled anteriorly over the ilii, thoroughly securing them in position. From each side of the block, extending on the sides of the chest towards the axillæ, are two steel rods with knobs. To these rods is attached a belt of thick webbing, eight or more inches wide, which is strapped over the abdomen, and assists in preventing any rising of the lumbar vertebræ.

By these means the pelvis is rendered a solid fixture. To the upper edge of the box or block, and parallel with the anterior margin of the ilium on each side, a narrow bar of steel is screwed, which extends on a level to the lower third of the femur, just above the knee.

At this extremity of the bar are notches which admit the thumb-screw of a padded steel band which grasps the femur. This band is movable to allow of change of position and pressure, and swivels on a pivot to adapt itself to any angle required. In this bar or rod, opposite the hip-joint, two ratchet-screws are inserted, one moving the free extremity of the rod upward and downward, the other acting laterally inward and outward. The pelvis being first secured, as before described, we have here an almost irresistible force with which to extend or flex, abduct or adduct, and this may be accomplished by movements so regulated and graduated as to be almost imperceptible to the patient.

Practically, this has proved the only efficient apparatus for straightening the hip in the difficult cases to which I have referred. All who have attempted to treat cases of this description must have experienced the need of such an instrument.

NOTE. The block is so divided that a section can be removed to give place to a galvanized iron pan for the reception of the alvine and vesical discharges.<sup>1</sup>

<sup>1</sup> The apparatus and its manner of action were exhibited to the Society.



